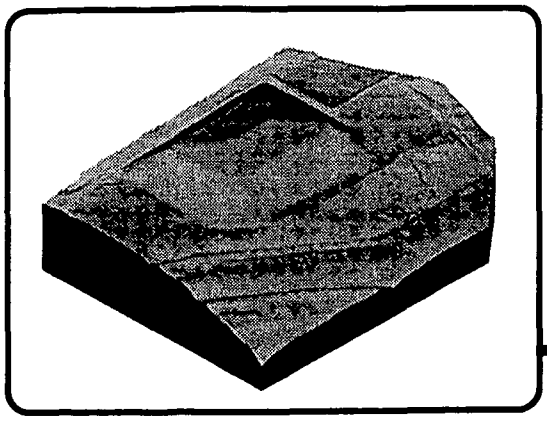


Cleaning up the Solar Ponds

An Overview of the OU4 IM/IRA-EA Decision Document

Operable Unit (OU)4 is one of 16 OUs at Rocky Flats, contaminated areas designated by the 1991 Interagency Agreement as candidates for remediation. The agreement, among the Department of Energy (DOE), the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and the Environment (CDPHE), ranked these OUs by number, according to the estimated threat posed by each to human health and the environment.

OU4 Background

OU4 covers approximately 30-acres in the northeast corner of the industrial area of the site, and includes all five of the small, man-made lakes known as the Solar Evaporation Ponds. From the time when weapon component production began at Rocky Flats in the 1950's until the mid 1980's, some of the by-products of the manufacturing process became mixed with water. This so-called "process water"was piped to the Solar Ponds for treatment. There the water could be allowed to evaporate, and the suspended manufacturing residues, contaminated by nitrates, hazardous chemicals and radioactive material, would settle to the bottom of the ponds to form sludge. This sludge was periodically removed from the ponds, treated and shipped to Idaho for disposal. Some of the ponds were lined with material designed to keep contaminated water from seeping into the ground beneath. Regular maintenance and repair was performed on the pond liners. After 20-odd years and several cycles of sludge removal and liner repair, site officials had reason to suspect that contamination had been released into the environment under and around the ponds. In fact, in 1970, water samples taken from North Walnut Creek, the drainage located to the north of the ponds, showed evidence of nitrate contamination. To keep this contamination at bay, a series of trenches were dug to intercept groundwater before it reached the creek, and pumps were installed to move the collected water back into the ponds. Additionally, the pond liners were upgraded to decrease the possibility of seepage.These measures alleviated the contamination to the North Walnut Creek drainage, but the discovery of contamination outside the Solar Ponds hinted at a potentially larger problem: Where was the contamination coming from, and where might it migrate?

When production ceased at Rocky Flats in 1989, the Solar Ponds had already been idle for several years, but the detection of contamination in the environment around them gave high priority to the characterization of this contamination, the assessment of the risk it poses to human health and the environment, and the formulation of a plan to clean it up. The Interagency Agreement, as well as legal requirements under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), mandated that DOE choose a course of action for the closure and remediation of OU4.

Birth of a Decision Document

So began a two-year project , under the joint auspices of the DOE, the CDPHE and the EPA, to gather and compile the data needed to make that choice. The end product of this effort, which carries the prodigious title of "Operable Unit 4 Interim Measure/Interim Remedial Action-Environmental Assessment Decision Document (OU4 IM/IRA-EA DD)," contains detailed studies of all OU4 cleanup issues. Among them:

- the contaminants present in and around the ponds,
- the contaminant concentration levels,
- the extent of contamination,
- the degree of health and environmental risk indicated by the contaminants, and
- the geology, ecology and climate of the pond area.

The study also included an evaluation of reasonable measures for remediation of OU4. Several applicable cleanup technologies and alternative approaches to remediation were investigated in detail. The alternatives ranged from "no action" to the removal and shipment offsite of every cubic foot of contaminated soil. Each technology and alternative was evaluated for the capability to provide the necessary risk reduction at a reasonable cost.

The study concludes with a conceptual design for the cleanup alternative that appears most promising. This solution, an engineered cover which would be built over the Solar Ponds, is cost effective and would meet risk mitigation requirements.

The engineered cover, also called a cap, is an accepted method for the closure of a "surface impoundment" like the Solar Ponds. The pond liners and treated sludges from the ponds would be consolidated under the cap, along with contaminated soils from the area surrounding the ponds. The design of the cap is based on research conducted at the DOE's Hanford facility and Los Alamos National Laboratory, and uses natural materials and processes appropriate for semi-arid regions such as the Front Range to provide the structure with a projected life span of a thousand years. The OU4 cap would consist of several layers, including one of impermeable asphalt, to prevent surface water from passing through to the contaminated material beneath. The cap's integrity would be monitored for at least 30 years, as would nearby surface and groundwater.. While the engineered cover does not provide a so-called "clean closure" of OU4, it does meet RCRA and CERCLA guidelines for a closure of this type. More significantly, the cover provides the contaminant isolation and constraint necessary to maintain an insignificant health risk, even for people living and working next door to the site. The projected risk factor is 10-6, or one additional case of cancer per 1,000,000 people. Finally, at an estimated cost of $99 million, the cover plan is the most cost-effective way to reach OU4 closure goals. By comparison, the cost of the alternative involving the removal and shipment of all contaminated material from the pond area is estimated at more than $916 million.

The Department of Energy would like your input on theOperable Unit 4 Interim Measure/ Interim Remedial Action Environmental Assessment Decision Document . To that end, copies of the Decision Document will be available for a 60-day public review beginning February 10, 1995 at the following locations:

Department of Energy Rocky Flats Public Reading Room
Front Range Community College
Library
3645 West 112th Avenue
Westminster, CO 80030

The U.S. Environmental Protection Agency - Region VIII
Superfund Records Center
999 - 18th Street - Suite 500
Denver, CO 80222-1530

Rocky Flats Citizens Advisory Board
9035 Wadsworth Parkway -
Suite 2250
Westminster, CO 80021

The Colorado Department of Public Health & Environment
4300 Cherry Creek Drive South,
Building A,
Denver, CO 80222-1530

Standley Lake Library
8485 Kipling
Arvada, CO 80005

Due to the document's size and complexity, a Reader's Guide will be provided to help interested readers find their way through it.

For additional information, or to comment on the Operable Unit 4 Interim Measure/Interim Remedial Action Environmental Assessment Decision Document, please contact Eileen Jemison, EG&G Rocky Flats Community Relations, at (303) 966-2302.

The Decimal Outline

Most of the documents generated by or for the DOE are organized using a decimal outline system. A typical decimal outline looks like this:

Parts of the document are designated by Roman Numerals - **I, II, etc.**

Primary headings are numbered - **I.1, II.1, etc.**

Secondary headings are numbered - **I.1.1, II.1.1, etc.**

Figures and tables are located in the body of Secondary Headings, and are numbered - **I.1-1, II.2-2, etc.**

Appendices are located at the end of each Part, and are labeled - **I.A, II.A, etc.**

OUTLINE

Where to find the Decision Document:

Copies of the OU4 IM/IRA EA Decision Document will be available in the public reading rooms during a 60-day public comment period beginning February 10, 1995. There are five reading room locations:

READING ROOMS

Colorado Department of Public Health and the Environment
4300 Cherry Creek Drive, Building A,
Denver, CO 80222
(303) 692-2037

Rocky Flats Public Reading Room
3645 W. 112th Ave.
Westminster, CO 80030
(303) 469-4435

Rocky Flats Citizens Advisory Board
9035 Wadsworth Parkway, Suite 2250,
Westminster, CO 80021
(303) 420-7855

U. S. Environmental Protection Agency
Superfund Records Center
999 18th St., Suite 500,
Denver, CO 80202
(303) 293-1807

Standley Lake Library
8485 Kipling St.
Arvada, CO 80005
(303) 456-0806

More Information:

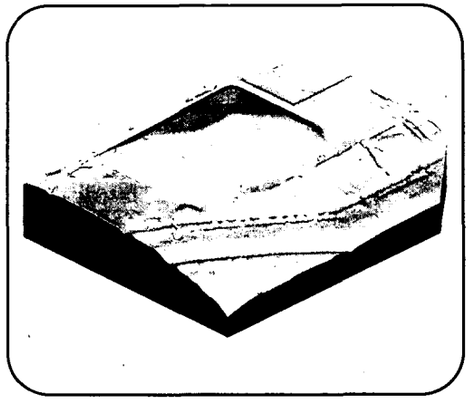
If you need to ask any questions about the Decision Document, you may contact

Steve Slaten
DOE Environmental Restoration
966-4839

or

Eileen Jemison
EG&G Community Relations
966-2302

Cleaning up the Solar Ponds:



A GUIDE to the OU4 IM/IRA EA Decision Document

Introduction

"Operable Unit 4 Interim Measure/Interim Remedial Action-Environmental Assessment Decision Document" is an expansive title, and the chronicle behind it is equally large. The 12- volume document contains almost 1400 pages of text and several hundred more of figures and appendices, and represents almost two years of study directed at Operable Unit 4, also known as the Solar Evaporation Ponds. But the purpose of this enormous compilation of data is simple. The Decision Document will allow Rocky Flats stakeholders to see the results of the exhaustive research that has been conducted to define the contamination problems presented by OU4. Interested readers can also learn about the details of several proposed closure solutions for OU4 which would meet relevant health, environmental and legal remediation requirements, and examine in depth the closure plan which appears to be the most promising.

The agencies involved in the formulation of this Decision Document, the Department of Energy (DOE), the Colorado Department of Public Health and the Environment (CDPHE) and the Environmental Protection Agency (EPA), want to encourage Rocky Flats stakeholders to comment on its content. This Guide has been developed as a "road map," to give readers an overview of the document and help them navigate through it.

Though the document is large, it is made up of many small pieces of information. This Guide will help you find the pieces that interest you.

The Decision Document supports the first phase of a RCRA-mandated two-phase approach to the remediation process at OU4. The document is organized using a decimal outline system, and is divided into five parts. The following is a brief overview of each part:

Part I-Introduction and Site Description
This part of the document contains:

- a description of how the OU4 IM/IRA program came to be, what the objectives of the program are, and how the Decision Document satisfies RCRA, CERCLA and Interagency Agreement stipulations,
- background and history of OU4, including notes on the purpose, construction and operation of the Solar Ponds, and
- the environmental setting around OU4, including complete studies of the climate, surface water, geology, ecology and current land use.

Part II-Remedial Facility Investigation/Remedial Investigation Results
This section contains:

- field investigation activities conducted to determine the nature and extent of the contamination present at OU4, including the methods used to sample and analyze material from the ponds and the nearby surface and near-surface(vadose) soils, and
- comprehensive results of field investigation activities, including:
  - the nature and extent of contamination,
  - how contamination moves and behaves, and
  - contamination distribution maps.

Part III-Interim Measures/Interim Remedial Action Design Analysis
This part contains:

- a list of remedial action objectives,
- calculation of preliminary remediation goals based on human health risk from exposure to soil-borne contaminants,
- a list of "contaminants of concern," materials like radioactive and heavy metals or organic compounds that are found in unacceptably high concentrations in OU4,
- an assessment of areas requiring remediation,
- an overview, or screening, of ten possible remediation technologies for the OU4 IM/IRA,
- a brief description of these technologies,
- a list of five "general response action" alternatives, ranging from "no action" to "removal and offsite disposal" of all contaminated material,
- the CERCLA-based criteria applied to general response actions, and
- an evaluation, based on those criteria, of the five general response actions which points to the most viable alternative.

Part IV-Conceptual Design for the IM/IRA Alternative
This part deals with the preferred OU4 remediation alternative, an Engineered Cover. The subjects covered include:

- a conceptual design description of the Engineered Cover, including the design basis and functional requirements for the project,
- precipitation infiltration modeling for the cover,
- a conceptual design description of a Subsurface Drain to carry groundwater away from the covered area,
- a plan for management of the hazardous, radioactive and mixed wastes generated,
- a proposed construction plan and schedule,
- a cost estimate,
- an analysis of the impact of the engineered cover as a permanent closure method for the OU4 IM/IRA on human health, area ecology, air quality and groundwater, including air dispersion and contaminant leachability models, and
- a summary of permitting and regulatory requirements which must be addressed.

Part V-Conceptual Post-Closure Monitoring and Assessment Plan
This section contains:

- a synopsis of the purpose and objectives of a post-closure monitoring program for the IM/IRA,
- the design basis for a post-closure monitoring system,
- an evaluation of post-closure care alternatives,
- a conceptual design for the most practical post-closure monitoring system, and
- a post-closure sampling and analysis plan covering the Engineered Cover, the Vadose Zone and the Groundwater

The Decision Document Table of Contents includes a more precise breakdown of each Part.

INTRODUCTION

PART I THROUGH V